



A large, grainy black and white photograph occupies the left two-thirds of the page, showing a space shuttle launching vertically against a dark, star-filled background. The shuttle's solid rocket boosters are visible at the base, and a bright plume of fire and smoke erupts from its side boosters.

SPACE AND
TECHNOLOGY
TRANSFER





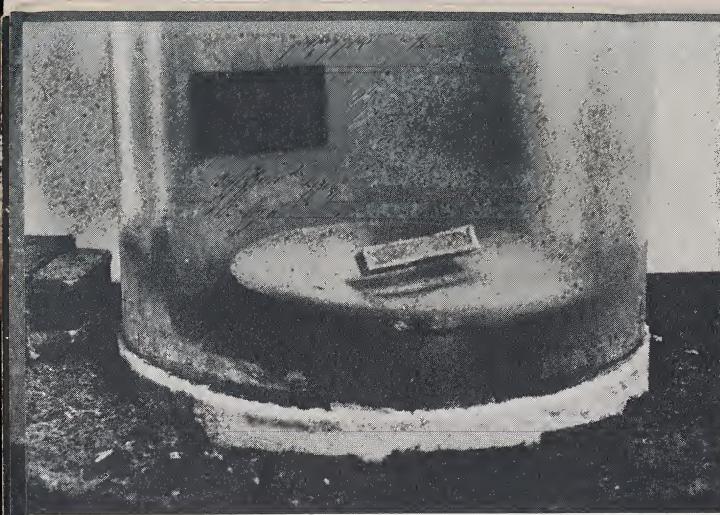
*...the transfer of technology
from space to private industry*

The University of Pittsburgh is seeking the shortest distance between two points—our nation's space exploration program and industrial use of its research findings. Its purpose: A new source of technology for business firms in the tri-state area.

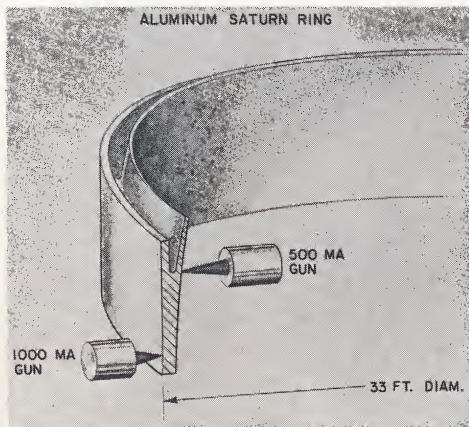
The University's technology transfer program, under contract with the National Aeronautics and Space Administration, is designed to assemble, via computer, facts from international aerospace projects and to route these facts, swiftly and selectively, to industrial corporations.

The information spin-off has a three-fold impact on participating companies:

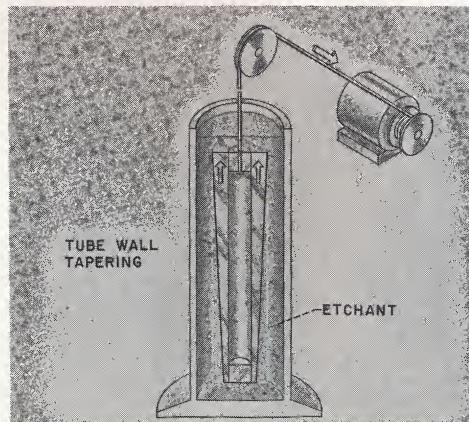
- It suggests new applications for existing products.
- It points the way for future research and development.
- It informs management of current aerospace requirements.



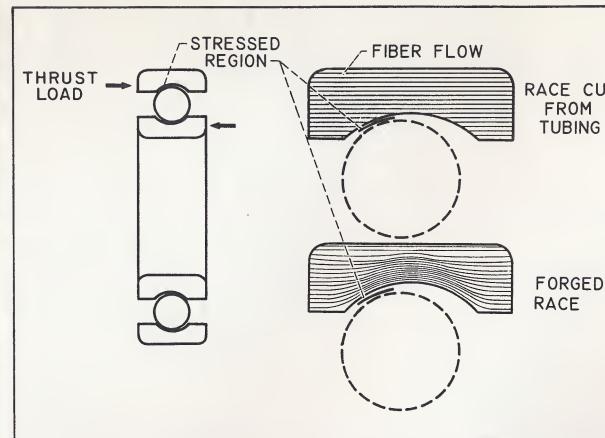
Magnet floating on its own field



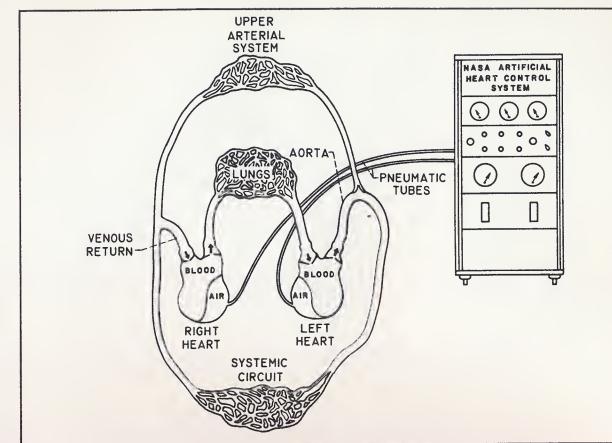
Electron beam welding



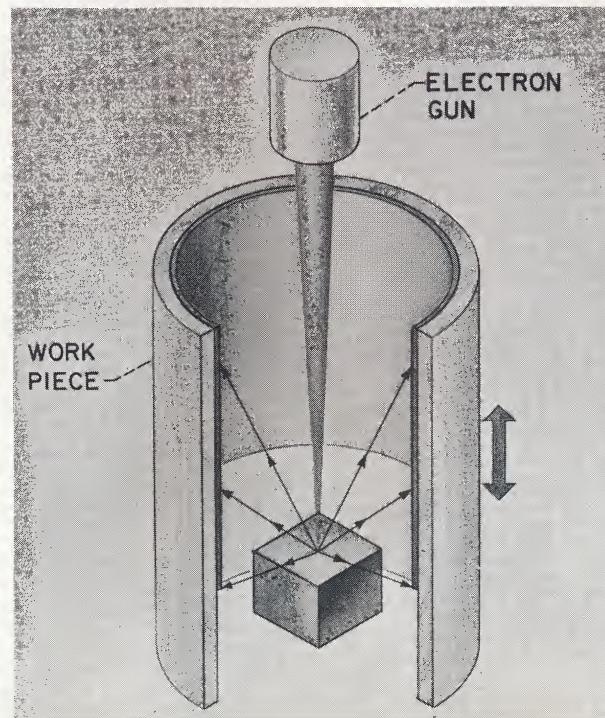
Chemical milling



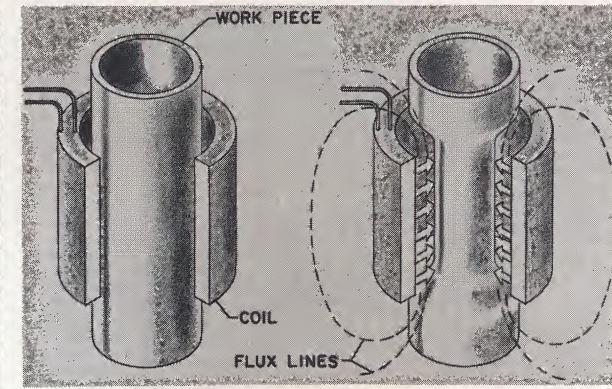
Fiber flow in bearing races



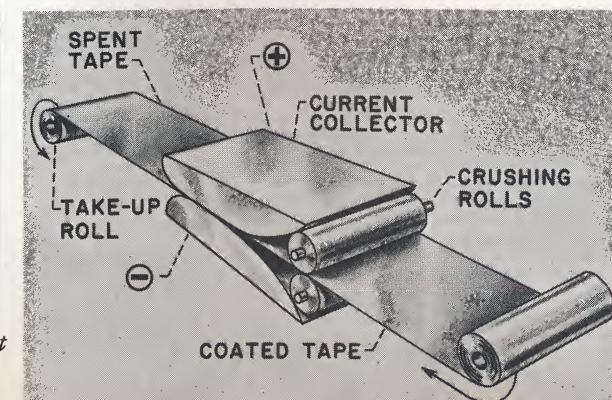
Circulatory system driven by pneumatic artificial hearts



Evaporative coating by electron beam



Magnetic forming



Dry tape battery concept

NASA research covers many fields.

INDUSTRIAL USES

Space research can no longer be rated exotic, for its yield of applications to industry has been full and profitable.

Some examples are:

- Non-stick coatings used for solid propellant mold releases are applied to aluminum molds used in the manufacture of felt hats.
- NASA research on electric power systems promises new applications for batteries, fuel cells, thermoelectric and magnetohydrodynamic converters.
- Horizon sensors which provided automatic stabilization and altitude control for space craft are used to measure hot steel rods travelling through a drawing mill at 35-75 miles per hour.
- NASA research in the fabrication of metals has yielded new uses for explosive, electrospark and magnetic forming processes. The laser, for example, though still on the threshold of development, can be used to bore holes in any known material by melting and evaporating.
- Refractory metals (molybdenum, tungsten, tantalum

and columbium), once rarely utilized, are now available in standard mill sizes, and, ductile and uniform, can be bent, formed, spun, forged and roll-formed into structural beams and channels.

The following partial list of STAR headings (Scientific and Technical Aerospace Reports) indicates the broad scope of aerospace data.

Aerodynamics of Bodies, Combinations, and Internal Flow	Facilities	Meteorology
Aerodynamics of Wings, Rotors, and Control Surfaces	Fluid Mechanics	Navigation and Guidance
Aircraft	Geophysics	Physics
Astronomy and Astrophysics	Heat Transfer	Propellants and Combustion
Auxiliary Systems	Human Behavior	Propulsion
Chemistry	Instrumentation	Space Radiation
Communications	Life Sciences	Space Sciences
Electronics	Machine Elements and Processes	Space Vehicles
	Materials, Metallic and Nonmetallic	Stresses and Loads
	Mathematics	Structural Design

NASA COMMITMENT

To secure top return on the billions currently invested in space research and development, NASA is making a deliberate effort to disseminate, as extensively as possible, its new technologies to industry.

James E. Webb, NASA administrator, clearly states this commitment: "It is our objective, in accordance with the directives given by Congress and the President in creating NASA, to insure that developments resulting from NASA's scientific and technological programs be retrieved and made available to the maximum extent for the nation's industrial and consumer benefit in the shortest possible time, thus strengthening the bridge between technical research and marketable end use."

NASA's Scientific and Technical Information Division collects, processes and distributes, through bulletins, microfilm, tape and other forms, a comprehensive store of aerospace information.

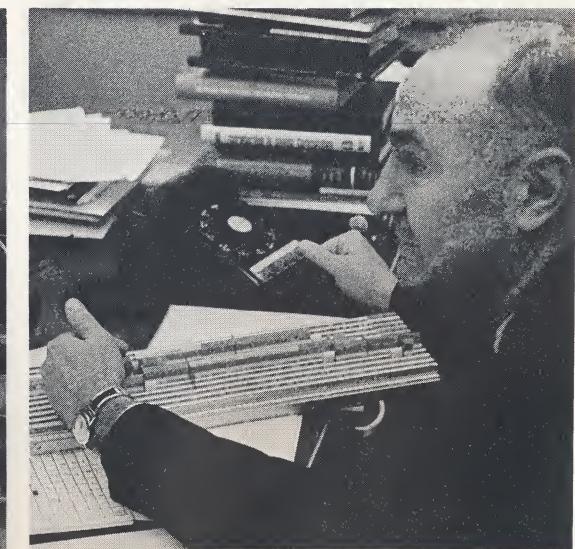
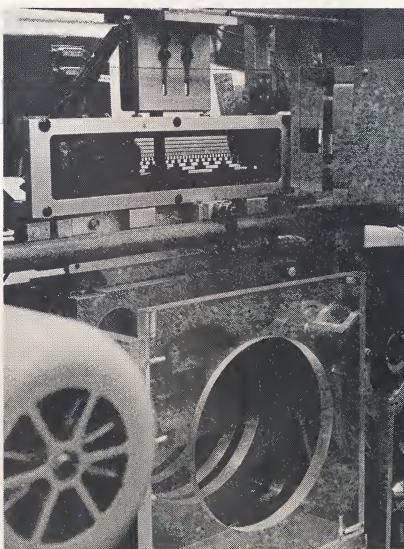
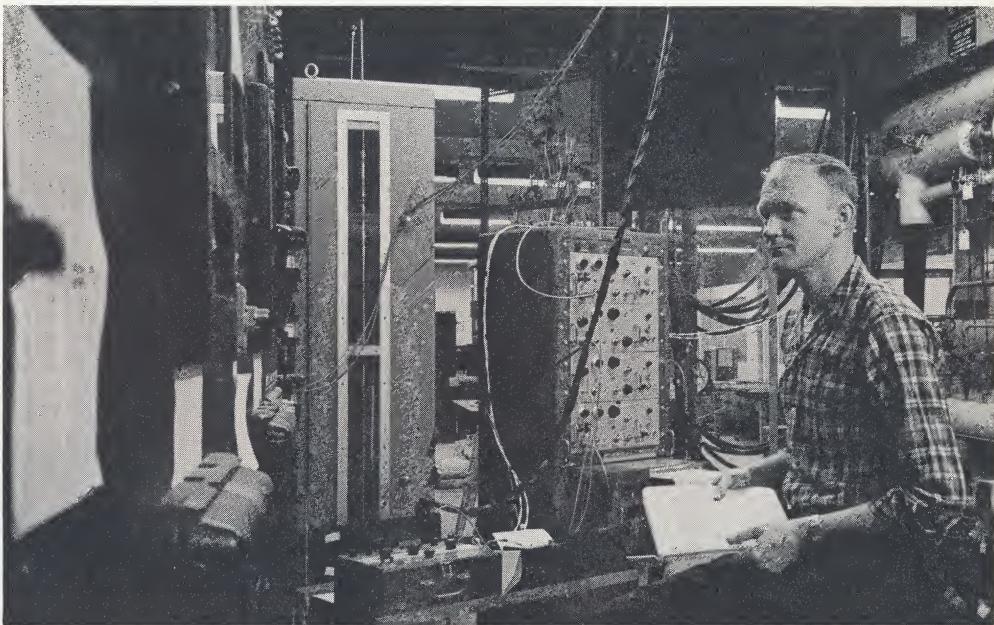
THE UNIVERSITY'S ROLE

More than 3000 documents on aerospace research are published each month. The company engineer or scientist seeking splinters of knowledge in a specialized area may well be confounded by the wealth of published information; yet often it contains facts which are essential to a company's progress.

The Knowledge Availability Systems Center at the University of Pittsburgh has established a program to "customize" the NASA information—to sift from voluminous research results those particular findings which are pertinent to the activities, skills, equipment, manpower and know-how of each subscribing company.

The program merges the talents of many divisions of the University. Faculty members of the Schools of Engineering and Mines and the Division of Natural Sciences help to interpret the needs of local companies and to pinpoint applicable research findings. Swift computerized searches for relevant information are made possible through facilities of the Computation and Data Processing Center.

*Engineers, scientists and facilities at
Pitt's Centers and Schools contribute to the information spin-off.*



HOW THE SYSTEM WORKS

The Interest Profile

Key to the operational routine developed at the University's KAS Center is the *interest profile*—a list of the specific concerns of a company engineer or scientist. Actually, the interest profile is a continuing question—*what are the research findings in these areas in which I am working?*

As Pitt's spin-off group works with the industrial scientist, the profile is revised and modified. In this way, information retrieved is continually relevant; and it is accessible within the scientist's own frame of reference. A chemist, for example, may require information fed into a data processor under one pattern of headings; a geologist, under another.

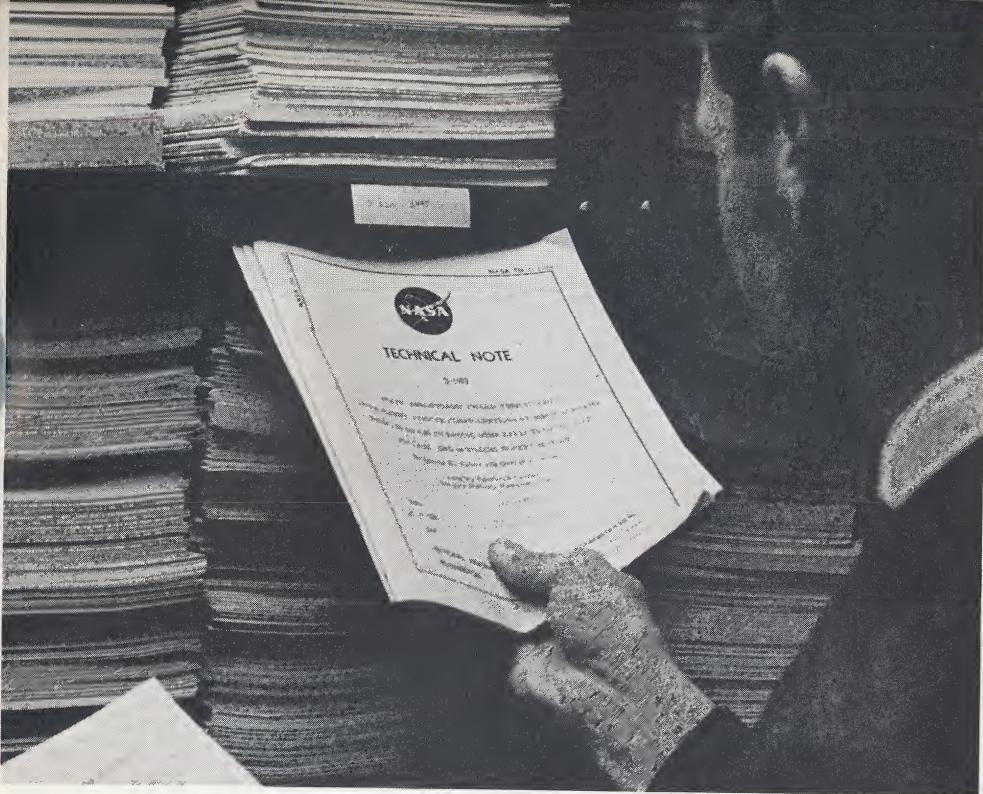
An interest profile may be established on a corporate as well as on an individual basis. Relevant data is then routed to key personnel throughout the company.

The Search Strategy

The technology transfer program is built around a computerized information storage and retrieval system, updated each month with:

- More than 3000 documents on current aerospace developments.





- Abstracts of all documents.
- A cumulative index to the documents, stored on tape for computer retrieval.

Search strategies begin by determining *key words* in the interest profile or inquiry. Technical dictionaries and other literature are searched for synonyms and related terms. The complete list of terms is then matched, by computer, against the index for aerospace data and related documents are identified.

Feedback

University analysts review data which has been identified by computer search. Abstracts of relevant aerospace documents are sent to the company, whose evaluation is indicated, by checkmark, on a feedback order form: pertinent, not pertinent, peripheral or full document requested.

In this way, the program continually reflects the precise needs and interests of each subscribing company.

Carnegie Library Sources

The KAS Center's search for information pertinent to industry extends to the Science and Technology Division of Carnegie Library of Pittsburgh, which offers a complete depository of

federal reports and documents. A special staff member, working full-time at the Library, conducts literature searches in areas covered by these federal agencies:

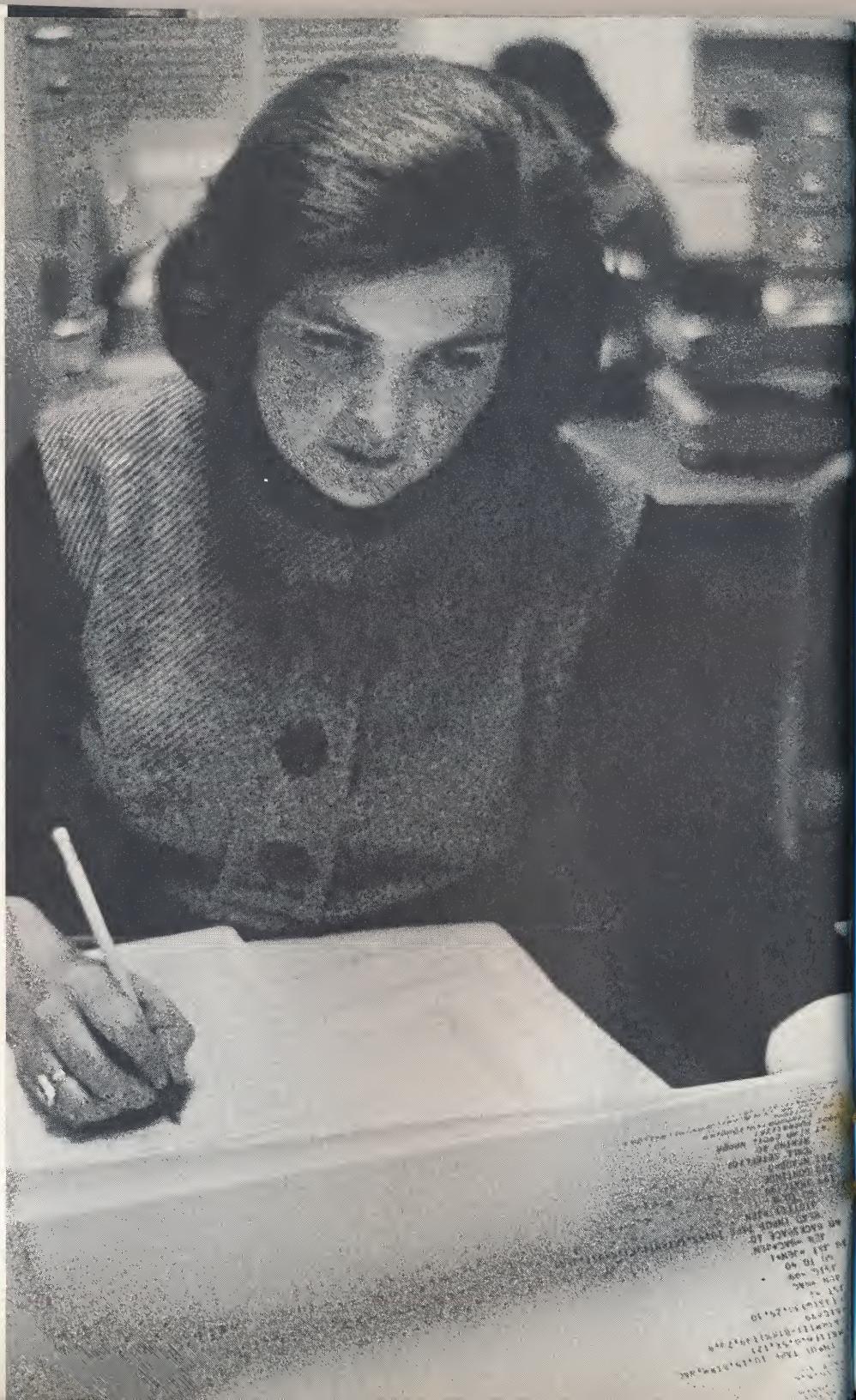
- Atomic Energy Commission
- Office of Technical Services
- Defense Documentation Center

These sources augment the University's store of STAR (Scientific and Technical Aerospace Reports), published by NASA, and IAA (International Aerospace Abstracts).

HOW TO SUBSCRIBE

A company may subscribe to the technology transfer program by contacting the KAS Center at the University. A personal interview is arranged and these points are covered:

- Range of services provided.
- Specific interests of the company.
- Procedures to assure a steady flow of pertinent information to individual company engineers and scientists or to management.
- Technical consulting service with members of Pitt's faculty.



A partial list of firms which have subscribed to the University's information spin-off program:

*Aluminum Company of America
Gulf Research and Development
Company
Jones and Laughlin Steel Company
Koppers Company, Incorporated
National Steel Corporation
Pittsburgh National Bank
Pittsburgh Plate Glass Company
Pittsburgh Steel Company
United States Steel Corporation
Westinghouse Corporation
Wheeling Steel Corporation*

THE KNOWLEDGE AVAILABILITY SYSTEMS CENTER
ALLEN KENT, DIRECTOR
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